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April 10, 2009

Ms. Tracy Egoscue
Executive Officer
Los Angeles Regional Water Quality Control Board
320 West Fourth Street, Suite 200
Los Angeles, CA 90013

Re: Fourth Draft Ventura County Municipal Separate Storm Sewer System Permit, dated February 24, 2009 (NPDES Permit No. CAS004002)

Dear Ms. Egoscue:

On behalf of Heal the Bay, we submit the following comments on the February 24, 2009, Fourth Draft Ventura County Municipal Separate Storm Sewer System Permit ("Fourth Draft" or "Permit"), NPDES Permit No. CAS004002. We submit these comments to address important areas in which the Permit must be strengthened to best resolve Ventura County's water quality problems. We also incorporate by reference the October 15, 2007 letter submitted to the Regional Board by Heal the Bay and NRDC, the May 29, 2008 letter submitted by Heal the Bay and the April 10, 2009 letter submitted by NRDC and Heal the Bay.

Our comments concern four areas within the Permit: (1) Performance Criteria; (2) Municipal Action Levels (MALs); (3) TMDL waste load allocations; and (4) Monitoring Requirements. We believe that the Permit can be – and needs to be – revised as we have described in order to meet the Clean Water Act's NPDES standards. These concerns are described in detail below.

I. Performance Criteria

The Draft Permit's performance-based criteria should be slightly modified for clarification purposes.

We commend the Regional Board for including BMP performance criteria in the Fourth Draft. One of the most effective ways to ensure the success of stormwater programs and the attainment of water quality standards is to require performance-based criteria. Appropriately, the Permit includes scientifically-based Treatment BMP Performance Design Standards for treatment control BMPs implemented under the provisions of this Order (subpart 4.A.3 and Attachment C), whereas the previous draft contained arbitrary BMP performance ranges. It is likely an oversight, but this Draft Permit does not include a design storm component. We ask that the Regional Board include a design storm component to the current language in order to provide certainty to the regulated community on how to apply the design criteria. Since this is a new concept, we believe that the SUSMP standards that have been used for a decade in local stormwater permits should apply. The 85th percentile storm standard in SUSMP should be used (the 85th percentile runoff event

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with 0.2 inches per hour intensity). In addition for clarification, we ask that the Regional Board insert the following language into subpart 4.A.3: "Every BMP constructed in Ventura County during the life of the permit shall meet the design performance criteria."

II. Municipal Action Levels ("MALs")

The MALs provided in the Permit are seriously flawed and should be revised.

The Fourth Draft includes municipal action levels ("MALs") that were calculated using the 80th percentile concentrations of selected pollutants in the nationwide Phase I MS4 monitoring data. The Permit calls for an Action Plan to address exceedances of MALs, if monitoring data show that there is a "running average of twenty percent or greater exceedances of the MALs." Of note, each of the four drafts of the Ventura County Municipal Separate Storm Sewer System Permit released by the Regional Board for public comment has included a section on MALs, yet each version has been significantly weaker than its predecessor in this area despite our request for strengthening the MALs after every draft. In the Fourth Draft, there are only five pollutants with associated MALs (down from thirteen in the previous draft and sixteen in the first draft), and four of the five MALs are less stringent than those proposed in the May 29, 2008 draft.

Although MALs are not intended as equivalent to attainment of water quality standards, the comparison to California Toxics Rule ("CTR") criteria brings to light flaws with the proposed values. As shown in the following table, the proposed copper, lead, and zinc MALs are significantly less stringent than CTR criteria. For instance, the lead MAL is *twenty-eight times* less stringent than the CTR chronic criterion. Discrepancies of this magnitude are not substantiated.

Parameter	Proposed MAL (ug/L)	CTR Acute Criterion(ug/L)	CTR Chronic Criterion(ug/L)
Total Cu	87	13.5	9.38
Total Pb	122	82.17-110	3.16-4.24
Total Zn	660	122.7	121.7

Table 1: Comparison of proposed MAL values and CTR criteria

More important, a comparison of the MALs to actual BMP performance data shows that the MALs are flawed. The attached tables (Exhibit 1) were taken from an analysis by Geosyntec Consultants of the ASCE/EPA BMP database.[1] The comparison of the proposed MALs to demonstrated BMP effluent water quality clearly indicates that the MALs are set to reflect

[1] The Geosyntec study was an internally funded document on BMP performance. Heal the Bay's use of this information does not imply any agreement or disagreement by Geosyntec with the conclusions advanced by Heal the Bay.

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relatively poor BMP performance. For instance, the proposed MAL for total copper is 87 ug/L, while over 95% of the hydrodynamic devices in the database achieve at least 38.55 ug/L total copper. The median performance is 15.41 ug/L. As another example, the MAL for zinc is 660 ug/L, while even the worst 5% of biofilter BMPs achieve 181.28 ug/L. The median performance is 30.26 ug/L.

In other words, almost all of the BMPs that were monitored achieved better effluent water quality than the proposed MAL in these cases, and the median performance is vastly superior to the MAL value. This discrepancy between the proposed MALs and demonstrated BMP performance cannot be justified given that MALs are used to trigger further action such as modifying BMPs. Municipal stormwater permits have required BMP implementation to the maximum extent practicable for nearly two decades, and the current MAL provision gives the impression that implementation of even the worst performing BMPs is an appropriate Municipal Action Level. Although the majority of the Fourth Draft appropriately removes any association between MALs and MEP, the definition still maintains that MALs are used to identify areas that require additional attention in order to "reduce the discharge of pollutants to the maximum extent practicable."[2] The MALs in the Fourth Draft in no shape or form represent MEP as demonstrated in the comparisons to BMP performance data above. This is likely an oversight, but it is critical that this definition be modified accordingly in the Fourth Draft.
The MAL approach in this draft will never allow water quality standards attainment in receiving waters impacted by municipal stormwater discharges.

The MAL concept has great potential as identifying problem areas and requiring follow-up actions until the MALs are achieved. MALs should furthermore be retained in the final Permit, but more pollutants should be given a MAL and the values must be strengthened to reflect good science and existing technical achievement in this region and the rest of the country. The Board could use as its reference point the water quality achieved by the top 10% of MS4 programs in the U.S. Clearly, these programs have systematically implemented BMPs in an effective manner that achieves water quality improvement. Alternatively, the Board could utilize the Geosyntec analysis of BMP performance to develop appropriate MALs. Perhaps an average of the median performance levels for the range of appropriate BMP types would be a good approach.

III. TMDLs

The Permit must include numeric effluent limits based on waste load allocations ("WLAs") and required implementation actions for <u>all</u> TMDLs in effect in Ventura County.

Appropriately, the Regional Board includes Waste Load Allocations and required implementation schedule actions for most TMDLs that are in effect in Ventura County. Federal law clearly commands that the Board integrate already adopted TMDLs into the effluent limitations of appropriate NPDES permits. Specifically, federal regulations require that:

> Effluent limits developed to protect a narrative water quality criterion, a numeric water quality criterion, or both, are consistent with the assumptions and requirements of any available wasteload allocation for

[2] Fourth Draft at 104.

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> the discharge prepared by the State and approved by EPA pursuant to 40 CFR 130.7.[3]

Further, implementation schedules' actions must be included in the Permit, as they are vital steps in ensuring that dischargers are on-track for ultimate compliance with the waste load allocations.

However, the Permit fails to include WLAs for four TMDLs in effect in Ventura County: Calleguas Creek Watershed Salts TMDL (in effect December 2, 2008), Calleguas Creek Nitrogen TMDL (in effect July 13, 2003), Santa Clara River Chloride TMDL (in effect May 4, 2005), and Malibu Creek Nutrients TMDL (in effect March 22, 2003). In conversations with Regional Board staff, it appears that chlorides in Santa Clara and nutrients in Calleguas Creek are primarily attributed to POTWs and thus were excluded from the Draft Permit. However, the Santa Clara River Chloride TMDL includes a WLA for "other NPDES" permittees. This should be considered for inclusion in the Draft Permit. In addition although the Regional Board-approved TMDL updates to the Santa Clara River Chloride TMDL and Calleguas Creek Nitrogen TMDL from late 2008 are not in effect, the previously adopted TMDLs for these waterbody-pollutant combinations are in effect. Thus these WLAs should be included in the Draft Permit.

The absence of the Malibu Creek TMDL WLAs in the permit is particularly troublesome, as stormwater is a large source of nutrients to the Creek. High nutrient concentrations and eutrophication problems continue to plague the Malibu Creek watershed, yet the Regional Board has not included nutrient WLAs, LAs or effluent limits in any permits to date despite the fact that the TMDL was approved by the USEPA over six years ago. Thus, the Board must modify the Permit to include these numeric WLAs in the Ventura MS4 permit.

In addition, the Malibu Creek Trash TMDL has been approved by State Board but is not in effect as of the date of this letter. The WLAs and implementation actions in this TMDL should be included in the Permit, if it comes into effect before the Board hearing to consider this item. As these and other future TMDLs come into effect, the Board should incorporate the appropriate WLAs into the MS4 Permit as soon as possible.

The Permit must clearly state that numeric effluent limits based on waste load allocations are enforceable.

The Draft Permit appears to state that an exceedance of a WLA may not be enforced upon:

> "If any WLA is exceeded at a compliance monitoring site, permittees shall implement BMPs in accordance with the TMDL Technical Reports, Implementation Plans or as identified as a result of TMDL special studies identified in the Basin Plan Amendment. Following these actions, Regional Water Board staff will evaluate the need for further enforcement action."[4]

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[3] 40 CFR § 122.44(d)(1)(vii)(B).
[4] Fourth Draft Permit at 85--95.

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The implementation of an implementation plan or special study does not constitute an enforcement action. A WLA must be met for purposes of water quality standards attainment and is an enforceable limit. Thus, the Permit must clarify that any exceedance of a WLA is a violation and will be enforced.

Miscellaneous

- The zero trash WLA for Revolon Slough and Beardsley Wash and Ventura River Estuary is appropriately included in the Permit. However the Draft Permit should also include the trash reduction milestones. For instance, a 20 percent trash reduction from baseline is required at year four.
- There appears to be a typographical error for the Arroyo Simi 4,4-DDD Interim WLA in Table 11. The Basin Plan Amendment assigns a limit of 14 ng/g, not 140 ng/g.
- WLAs for nitrogen compounds in Reach 7 of the Santa Clara River are not included in the Draft Permit. Is Reach 7 within Ventura County? If so, this WLA should be included in the Draft Permit.

IV. Monitoring

The Clean Water Act requires that a Permittee undertake a self-monitoring program sufficient to determine compliance with its NPDES permit.[5] This general requirement is reflected in the Fourth Draft, which lists one of its monitoring goals as assessing "...compliance with TMDL targets and water quality objectives."[6] However, many elements of the Monitoring Program (Attachment F) must be strengthened in order to meet this stated objective.

As an overarching comment, the monitoring program in the Draft Permit is difficult to evaluate, as it is unclear what monitoring is already underway and the additional monitoring locations required in the Draft Permit. As we have asked for on numerous occasions over the last year, the Board Staff should compile a list or table of all stormwater monitoring requirements in order for the public to evaluate whether the Permit's requirements, when combined with current monitoring efforts, will be sufficient. Heal the Bay has asked for the Ventura County TMDL monitoring requirements for 9 months, yet Ventura County and the Regional Board have not provided that information, thus making assessment of the adequacy of the MS4 monitoring program impossible. This additional monitoring program information is especially important given that there is only receiving water monitoring at mass emissions locations and not throughout the watersheds. In general, though, the Permit must contain minimum monitoring requirements, which are necessary to assess compliance and impacts from the MS4. If another program covers some of these requirements, the discharger can work with this other monitoring program to coordinate logistical issues like cost-sharing.

[5] *See* 40 C.F.R. § 122.44(i)(1).
[6] Fourth Draft Permit at F-1

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Beach Water Quality Monitoring

We commend Regional Board staff for requiring beach water quality monitoring at ten Ventura County beach locations in the proposed monitoring program. As you know, stromwater runoff is a major source of beach bacteria pollution. It is critical that the Permittees be on hand to undertake beach water quality monitoring at stormwater impacted sites should the Health Department discontinue this weekly monitoring, as this is a major public health issue. However, we ask that the Regional Board expand the scope of the monitoring program to include *year-round monitoring* at these beach locations, similar to what the Regional Board has required for the LA County MS4 permit for over a decade. Nuisance flows occur on a year-round basis and are a known source of bacteria to beaches. In addition for clarity purposes, the Regional Board should outline within the Permit that a minimum of *weekly* monitoring will be conducted. Although this is implied by stating that the monitoring shall be conducted in accordance with AB 411 procedures, it should be clearly stated within the Permit. Lastly, the Permit should specify that monitoring take place at the wave-wash directly in front of stormdrain and stream sources (point zero). This is necessary to ensure that the waters closest to the discharge are evaluated.

Major Outfall Monitoring

The Draft Permit requires monitoring at "the end-of-pipe of major outfalls" four times per year and includes the latitude and longitude of eleven locations throughout the County that should be monitored on this cycle. Without accompanying maps or descriptions of the sites, it is nearly impossible to determine if the selected outfalls are truly representative of the discharge area. The Regional Board must ensure that appropriate land-use categories are monitored in order to be able to more readily determine if a MS4 is causing or contributing to a water quality objective exceedance, and if so, which Permittee. Drainages carrying stormwater from commercial, industrial, and high-use transportation should be prioritized. More importantly, without the more detailed descriptions of the subdrainages, the efficacy of the monitoring program for determining municipality compliance assessment can not be readily determined.

In addition to outfall monitoring, there should be downstream receiving water monitoring at each of these stations in order to assist in the determination if MS4 discharges are causing or contributing to water quality standards exceedances. This monitoring program shortcoming has plagued the Regional Board in previous permits and has contributed to a lack of compliance assurance action based on exceedances of receiving water quality standards. More monitoring locations are likely merited for better compliance assurance purposes, but we can't tell based on the lack of information provided in the permit. Of note, the first draft of the Permit included a tributary monitoring program to identify sub-watersheds where stormwater dischargers are causing or contributing to exceedances of water quality objectives; the major outfall monitoring program must now serve this purpose as the tributary monitoring is no longer included as an element in the core monitoring program.

Several clarifications are necessary in the Major Outfalls section of the Monitoring Program. Although the Permit requires that a total of four monitoring events shall be sampled per identified major outfall each year[7], a subsequent subsection states that "[i]n the first year after the

[7] Fourth Daft at (Section B.I.1(c))

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permit adoption, 4 major outfall stations shall be monitored. Thereafter, all major outfall stations listed in Attachment H are to be monitored annually according to the schedule above."[8] These two subsections appear to be in conflict. At a minimum, all eleven stations must be monitored four times per year. In addition, Attachment H does not list major outfall stations. Perhaps this is a typographical error. Accordingly, the Regional Board should make necessary clarifications to the Permit.

Mass Emissions Monitoring

The mass emissions monitoring element of the Draft Permit's core monitoring program requires that three mass emission stations be monitored four times per year.[9] This is a very small number of monitoring locations given that Ventura County covers an area of 1,873 square miles and multiple Permittees preside over each of the three main watershed management areas ("WMAs"). A stated goal of the mass emissions monitoring program is to determine if the MS4 is causing or contributing to exceedances of water quality objectives.[10] As we've stated above, the best way to determine compliance is to have receiving water monitoring stations just below major outfall monitoring stations. The Mass Emission Stations integrate the pollution sources from the entire watershed and give one an estimate of the pollutant load to the ocean.

TMDL Monitoring

The Total Maximum Daily Load Monitoring section of the Draft Permit simply refers back to the monitoring plans that have been "agreed upon" by stakeholders. This ambiguity makes review of the overall scope of the Draft Permit's monitoring program in conjunction with the TMDL monitoring plans extremely difficult as the monitoring provisions are not described in the permit itself. It is impossible to discern if the TMDL monitoring programs are adequate for determining if water quality objectives are achieved in the receiving water. Also, are monitoring programs in place for all of the TMDLs that are in effect in Ventura County and have all of these monitoring plans been approved by the Regional Board Executive Officer? The Regional Board should provide specificity and clarity in the Draft Permit's TMDL monitoring program.

Dry Weather Monitoring

The Fourth Draft includes a new monitoring section for "Dry Weather Monitoring." This monitoring entails collecting samples and/or taking visual observations once per dry season at outfalls to be selected by the Permittees at a later date. While we appreciate this idea in concept, the program outlined is insufficient to meet the objectives. First, the Permit requires that each Co-Permittee identify 5 monitoring stations; however, it is unclear if each of these stations will be monitored as the Permit also refers to "a primary station" and "four alternate stations" in a later subsection. The Regional Board should clarify that all 5 stations in each jurisdiction should be monitored. Any fewer sampling sites would have very limited use, due to the variability of nuisance flows. In addition requiring only one sampling event per year will not capture the variability of nuisance flows. The nuisance flow issue is a significant problem throughout the

[8] Fourth Draft at Section B.I.1(d)
[9] Fourth Draft Permit at F-2.
[10] Fourth Draft Permit at F-1.

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Los Angeles Region, yet it is a problem that only the Las Virgenes MWD is aggressively pursuing. As we've seen historically, many cities are ignoring dry weather discharge and hosing prohibitions, and as a result, numerous beaches continue to frequently exceed beach bacteria TMDL requirements during the summer months. Thus, the Regional Board should increase the number of sampling events to at least twice per dry season. In addition, the Permittees should conduct pre-dawn and early morning visual inspections (including weekends) throughout the city on at least a monthly basis.

The Board should revise toxicity requirements to meet the working group's recommendations.

Several years ago, the Board convened a multi-stakeholder toxicity working group that developed the *SMBRC Technical Memorandum on Toxicity Testing of Wet and Dry Weather Runoff* ("Memorandum"). This working group was chaired by the Southern California Coastal Water Research Project ("SCCWRP") and included representatives from wastewater treatment and stormwater agencies. The objective of the SCCWRP- and stakeholder-authored Memorandum is to provide guidance to the Board for use in developing MS4 permit toxicity monitoring and reporting requirements. However, several of the current toxicity requirements in the Fourth Draft appear to be inconsistent with the Memorandum. For instance, the Memorandum recommends sampling both dry and wet weather events, but the Fourth Draft includes only wet weather sampling. The Board should revise the Permit to be consistent with the Board's working group recommendations.

Several of the toxicity monitoring program requirements included in the Third Draft are arbitrary and will not provide a proper determination of whether stormwater discharges are impacting aquatic life. A Toxic Reduction Evaluation ("TRE") is only triggered if the same pollutant or class of pollutants is identified through the TIE process.[11] TREs should be required when there is a trend of toxicity, even if the cause of the toxicity varies. Additionally, each TRE action should include an implementation plan with milestones for constructing specific BMPs that meet the 75th percentile performance criteria and target the pollutant of concern.

Through conversations with several of the Permittees, we understand that a concern with the toxicity monitoring is that there may not be sufficient flow to collect 5 gallons of receiving water to perform the test. The Permit seemingly provides an exception to sampling if a sufficient sample volume is not possible. We urge the Regional Board to include a clause that states an alternate location near the initial monitoring location should be selected if insufficient sample cannot be collected.

The Board should include bioassessment monitoring in the Permit that is sufficient for determining receiving water trends and stormwater impacts on specific aquatic communities.

The Fourth Draft Permit requires that the Permittees participate in the SMC Regional Monitoring Program for bioassessment monitoring. Specifically, the program calls for probabilistic monitoring at three to six sites in each of the three major watersheds and one fixed site in each of

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[11] Fourth Draft Permit at Attachment F-12.

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these watersheds. While the SMC Regional Monitoring Program is useful in measuring the overall health of Southern California watersheds, probabilistic monitoring does not provide adequate information on compliance or trends over time at specific sites. Including one fixed site in a large watershed will not solve this overall deficiency. The SMC Program should not take the place of a compliance monitoring program that is necessary for compliance assurance purposes in an MS4 permit. As Jim Harrington, bioassessment expert for California Department of Fish and Game, states in regards to the proposed SMC Regional Monitoring Program:[12]

> "... maintaining all or some of the 16 existing fixed sites in the Ventura River would also be important to help County staff pin point particular water quality problems or better track improvement in water quality due to implementation of site specific BMPs. A probabilistically designed monitoring program with only 6 sites a year is not adequate for watershed-wide compliance monitoring."

Bioassessment monitoring is critical to assess the full impacts of the discharge and should be performed on a regular basis. Ventura County has some of the best remaining aquatic biological resources in Southern California, and the impacts of stormwater on these resources must be assessed. Heal the Bay has monitored over a dozen fixed sites per year in the Malibu Creek watershed for over a decade to observe trends. In order to determine the impacts of stormwater on biological resources in receiving waters, the Board must include a defined semi-annual or annual bioassessment monitoring program with at least six fixed sites per watershed in the Permit as part of the "Core Monitoring" requirements.

Conclusion

We thank the Board Members and Board Staff for this opportunity to comment on the Fourth Draft. More than fifteen years after urban stormwater runoff permitting took effect under the Clean Water Act, the region still struggles with the impacts of this source of pollution. This draft Permit contains the seeds of approaches that can make a significant difference in better controlling runoff. However, the weaknesses described above must be corrected before the Permit is adopted.

If you have any questions, feel free to contact us.

Sincerely,

Mark Gold

Mark Gold, D. Env.
President

Kirsten James

Kirsten James
Water Quality Director

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[12] Email communication to Heal the Bay on February 3, 2009.

Effluent Statistics					Effluent Percentiles						
BMPID	Parameter	Count	NDCount	%ND	5th	10th	25th	50th	75th	90th	95th
Detention Basins	Cadmium, Dissolved (ug/L as Cd)	75	43	57%	0.012	0.020	0.050	0.144	0.566	1.830	2.167
Detention Basins	Cadmium,Total (ug/L as Cd)	97	29	30%	0.083	0.110	0.248	0.568	1.313	2.359	3.145
Detention Basins	Copper, Dissolved (ug/L as Cu)	152	0	0%	1.947	2.526	4.864	8.117	13.727	24.263	28.125
Detention Basins	Copper, Total (ug/L as Cu)	184	14	8%	2.870	3.697	7.180	13.016	21.922	32.357	42.223
Detention Basins	Lead, Dissolved (ug/L as Pb)	111	52	47%	0.061	0.093	0.185	1.031	3.353	5.731	7.519
Detention Basins	Lead, Total (ug/L as Pb)	146	18	12%	0.837	1.639	4.902	12.725	28.191	52.553	97.903
Detention Basins	Nitrate + Nitrite, Total (mg/L as N)	27	18	67%	0.002	0.003	0.010	0.048	0.142	0.575	1.020
Detention Basins	Nitrate Nitrogen, Total (mg/L as N)	103	10	10%	0.133	0.174	0.270	0.578	0.918	1.684	2.150
Detention Basins	Nitrogen, Ammonia Total (mg/L as N)	13	3	23%	0.016	0.019	0.029	0.048	0.098	0.208	0.289
Detention Basins	Nitrogen, Kjeldahl, Total (mg/L as N)	97	14	14%	0.436	0.542	0.781	1.242	1.951	3.162	3.918
Detention Basins	Nitrogen, Total (mg/L as N)	12	0	0%	0.528	0.575	0.775	1.272	2.431	3.856	4.495
Detention Basins	Phosphorous, Dissolved (mg/L as P)	49	12	24%	0.028	0.035	0.049	0.085	0.143	0.251	0.329
Detention Basins	Phosphorous, Total (mg/L as P)	174	20	11%	0.014	0.019	0.037	0.108	0.283	0.460	0.670
Detention Basins	Solids, Total Dissolved (mg/L)	81	1	1%	9.083	19.536	45.677	73.510	111.402	233.722	379.539
Detention Basins	Solids, Total Suspended (mg/L)	177	8	5%	2.114	3.043	9.192	21.958	43.145	76.742	117.692
Detention Basins	Zinc, Dissolved (ug/L as Zn)	153	1	1%	3.585	7.232	20.610	34.267	60.530	101.297	146.808
Detention Basins	Zinc, Total (ug/L as Zn)	207	2	1%	12.097	17.843	34.930	60.976	105.574	197.697	263.675
Biofilters	Cadmium, Dissolved (ug/L as Cd)	342	66	19%	0.079	0.096	0.199	0.200	0.200	0.303	0.464
Biofilters	Cadmium,Total (ug/L as Cd)	361	49	14%	0.081	0.149	0.200	0.206	0.424	0.840	1.258
Biofilters	Copper, Dissolved (ug/L as Cu)	399	4	1%	1.046	1.530	2.939	5.868	11.064	17.656	22.703
Biofilters	Copper, Total (ug/L as Cu)	468	9	2%	1.787	2.656	4.273	7.984	17.241	32.435	44.607
Biofilters	Lead, Dissolved (ug/L as Pb)	368	26	7%	0.293	0.471	1.000	1.000	2.959	6.677	11.700
Biofilters	Lead, Total (ug/L as Pb)	483	50	10%	0.824	1.000	1.345	4.157	14.028	43.513	66.517
Biofilters	Nitrate + Nitrite, Total (mg/L as N)	27	0	0%	0.138	0.174	0.311	0.611	0.955	1.641	2.215
Biofilters	Nitrate Nitrogen, Total (mg/L as N)	476	12	3%	0.052	0.095	0.165	0.375	0.748	1.601	2.486
Biofilters	Nitrogen, Ammonia Total (mg/L as N)	14	4	29%	0.007	0.009	0.017	0.031	0.066	0.142	0.173
Biofilters	Nitrogen, Kjeldahl, Total (mg/L as N)	395	4	1%	0.469	0.633	0.894	1.342	2.138	3.600	6.378
Biofilters	Nitrogen, Total (mg/L as N)	96	0	0%	0.128	0.205	0.396	0.643	1.560	2.329	2.855
Biofilters	Phosphorous, Dissolved (mg/L as P)	38	0	0%	0.136	0.151	0.197	0.283	0.483	1.039	1.417
Biofilters	Phosphorous, Total (mg/L as P)	539	8	1%	0.042	0.056	0.114	0.240	0.451	0.815	1.167
Biofilters	Solids, Total Dissolved (mg/L)	357	1	0%	11.444	23.210	46.397	76.845	114.831	164.080	201.933
Biofilters	Solids, Total Suspended (mg/L)	467	7	1%	1.255	3.043	8.371	20.027	49.854	115.978	233.464
Biofilters	Zinc, Dissolved (ug/L as Zn)	399	4	1%	5.000	5.000	8.732	19.485	35.696	52.821	71.794
Biofilters	Zinc, Total (ug/L as Zn)	533	51	10%	4.479	6.395	14.164	30.256	67.208	119.646	181.275

Effluent Statistics					Effluent Percentiles						
BMPID	Parameter	Count	NDCount	%ND	5th	10th	25th	50th	75th	90th	95th
Hydrodynamic Devices	Cadmium, Dissolved (ug/L as Cd)	79	32	41%	0.011	0.017	0.042	0.199	0.785	1.793	2.239
Hydrodynamic Devices	Cadmium,Total (ug/L as Cd)	88	25	28%	0.024	0.038	0.102	0.382	1.261	3.035	5.047
Hydrodynamic Devices	Copper, Dissolved (ug/L as Cu)	89	15	17%	1.074	1.409	2.961	9.580	16.630	31.985	41.695
Hydrodynamic Devices	Copper, Total (ug/L as Cu)	99	0	0%	2.791	3.340	7.462	15.409	21.659	32.301	38.550
Hydrodynamic Devices	Lead, Dissolved (ug/L as Pb)	89	35	39%	0.123	0.201	0.434	1.184	3.769	7.376	8.733
Hydrodynamic Devices	Lead, Total (ug/L as Pb)	95	8	8%	0.887	1.351	2.691	6.297	13.428	23.845	42.576
Hydrodynamic Devices	Nitrate + Nitrite, Total (mg/L as N)	42	13	31%	0.062	0.078	0.117	0.226	0.359	0.506	0.707
Hydrodynamic Devices	Nitrate Nitrogen, Total (mg/L as N)	59	2	3%	0.073	0.098	0.152	0.306	0.680	1.299	2.120
Hydrodynamic Devices	Nitrogen, Ammonia Total (mg/L as N)	69	19	28%	0.009	0.014	0.041	0.090	0.313	0.814	1.103
Hydrodynamic Devices	Nitrogen, Kjeldahl, Total (mg/L as N)	77	4	5%	0.224	0.351	0.566	1.086	1.830	3.576	5.984
Hydrodynamic Devices	Nitrogen, Total (mg/L as N)	13	0	0%	0.902	0.988	1.335	2.101	3.633	5.233	5.939
Hydrodynamic Devices	Phosphorous, Dissolved (mg/L as P)	58	19	33%	0.000	0.001	0.002	0.019	0.088	0.172	0.253
Hydrodynamic Devices	Phosphorous, Total (mg/L as P)	170	5	3%	0.011	0.023	0.067	0.148	0.270	0.926	2.612
Hydrodynamic Devices	Solids, Total Dissolved (mg/L)	198	6	3%	3.905	6.206	19.175	60.768	422.937	7951.478	22415.772
Hydrodynamic Devices	Solids, Total Suspended (mg/L)	199	14	7%	2.977	5.543	17.995	43.173	99.360	190.249	303.150
Hydrodynamic Devices	Zinc, Dissolved (ug/L as Zn)	99	18	18%	3.357	5.113	12.784	34.762	76.530	156.734	334.604
Hydrodynamic Devices	Zinc, Total (ug/L as Zn)	174	13	7%	11.341	17.793	37.092	69.089	124.178	201.430	291.030
Media Filters	Cadmium, Dissolved (ug/L as Cd)	111	74	67%	0.009	0.014	0.033	0.097	0.290	0.680	1.261
Media Filters	Cadmium,Total (ug/L as Cd)	139	80	58%	0.035	0.053	0.109	0.257	0.764	1.401	1.778
Media Filters	Copper, Dissolved (ug/L as Cu)	258	7	3%	1.344	1.971	4.050	7.064	13.178	23.449	29.351
Media Filters	Copper, Total (ug/L as Cu)	294	19	6%	1.881	2.692	5.569	9.795	19.043	35.176	54.304
Media Filters	Lead, Dissolved (ug/L as Pb)	227	117	52%	0.055	0.088	0.195	0.550	1.641	3.681	5.916
Media Filters	Lead, Total (ug/L as Pb)	251	44	18%	0.426	0.609	1.397	4.376	13.378	23.679	39.362
Media Filters	Nitrate + Nitrite, Total (mg/L as N)	35	11	31%	0.170	0.213	0.301	0.951	1.763	2.859	3.926
Media Filters	Nitrate Nitrogen, Total (mg/L as N)	232	16	7%	0.181	0.253	0.424	0.690	1.151	2.029	2.643
Media Filters	Nitrogen, Ammonia Total (mg/L as N)	38	19	50%	0.003	0.006	0.022	0.102	0.728	1.919	2.931
Media Filters	Nitrogen, Kjeldahl, Total (mg/L as N)	229	12	5%	0.352	0.464	0.855	1.491	2.303	3.779	6.796
Media Filters	Nitrogen, Total (mg/L as N)	20	0	0%	1.921	2.077	2.530	3.472	4.695	6.024	6.682
Media Filters	Phosphorous, Dissolved (mg/L as P)	90	21	23%	0.019	0.025	0.038	0.085	0.142	0.238	0.407
Media Filters	Phosphorous, Total (mg/L as P)	280	25	9%	0.018	0.040	0.075	0.129	0.230	0.394	0.566
Media Filters	Solids, Total Dissolved (mg/L)	114	0	0%	12.216	24.105	41.104	56.574	85.506	137.169	230.416
Media Filters	Solids, Total Suspended (mg/L)	358	15	4%	1.317	2.762	6.321	14.784	37.784	87.741	148.957
Media Filters	Zinc, Dissolved (ug/L as Zn)	254	15	6%	3.212	5.915	14.843	30.677	76.394	143.497	266.374
Media Filters	Zinc, Total (ug/L as Zn)	383	19	5%	2.596	4.680	14.669	35.580	103.083	281.505	436.429

Effluent Statistics					Effluent Percentiles						
BMPID	Parameter	Count	NDCount	%ND	5th	10th	25th	50th	75th	90th	95th
Retention Ponds	Cadmium,Total (ug/L as Cd)	200	89	45%	0.003	0.007	0.043	0.145	0.527	7.252	9.983
Retention Ponds	Copper, Dissolved (ug/L as Cu)	182	5	3%	1.744	2.473	3.224	4.358	5.976	9.829	12.865
Retention Ponds	Copper, Total (ug/L as Cu)	327	10	3%	1.122	1.891	3.140	5.367	8.958	28.112	49.725
Retention Ponds	Lead, Dissolved (ug/L as Pb)	153	53	35%	0.174	0.310	0.821	2.848	9.059	29.422	35.410
Retention Ponds	Lead, Total (ug/L as Pb)	404	78	19%	0.256	0.466	1.007	3.386	15.793	36.788	64.062
Retention Ponds	Nitrate + Nitrite, Total (mg/L as N)	247	18	7%	0.004	0.005	0.012	0.038	0.173	0.371	0.546
Retention Ponds	Nitrate Nitrogen, Total (mg/L as N)	142	2	1%	0.040	0.066	0.114	0.310	0.632	1.150	1.408
Retention Ponds	Nitrogen, Ammonia Total (mg/L as N)	265	21	8%	0.011	0.016	0.027	0.056	0.127	0.238	0.314
Retention Ponds	Nitrogen, Kjeldahl, Total (mg/L as N)	244	9	4%	0.463	0.577	0.772	1.043	1.571	2.258	3.202
Retention Ponds	Nitrogen, Total (mg/L as N)	239	0	0%	0.537	0.631	0.867	1.278	1.776	2.410	2.907
Retention Ponds	Phosphorous, Dissolved (mg/L as P)	204	5	2%	0.019	0.021	0.039	0.062	0.116	0.206	0.253
Retention Ponds	Phosphorous, Total (mg/L as P)	486	14	3%	0.018	0.035	0.063	0.142	0.283	0.714	1.198
Retention Ponds	Solids, Total Dissolved (mg/L)	79	0	0%	27.590	56.563	129.402	390.152	633.739	1389.317	1779.409
Retention Ponds	Solids, Total Suspended (mg/L)	469	3	1%	0.559	1.197	4.281	11.612	28.307	66.130	110.111
Retention Ponds	Zinc, Dissolved (ug/L as Zn)	158	6	4%	1.002	1.199	2.482	9.770	28.517	47.281	75.918
Retention Ponds	Zinc, Total (ug/L as Zn)	423	52	12%	1.426	2.172	7.183	19.601	37.214	70.121	121.125
Wetland Basins	Cadmium, Dissolved (ug/L as Cd)	7	4	57%	2.726	4.014	9.874	28.487	61.896	85.135	92.601
Wetland Basins	Cadmium,Total (ug/L as Cd)	50	1	2%	0.090	0.100	0.100	0.164	1.145	5.736	9.569
Wetland Basins	Copper, Dissolved (ug/L as Cu)	7	0	0%	4.772	4.956	5.538	6.522	7.389	7.724	7.793
Wetland Basins	Copper, Total (ug/L as Cu)	80	0	0%	1.087	1.578	2.257	3.091	5.404	8.409	10.310
Wetland Basins	Lead, Dissolved (ug/L as Pb)	11	1	9%	0.354	0.391	0.524	0.793	1.070	1.385	1.582
Wetland Basins	Lead, Total (ug/L as Pb)	91	0	0%	0.231	0.377	0.830	1.066	2.351	4.940	6.356
Wetland Basins	Nitrate + Nitrite, Total (mg/L as N)	144	0	0%	0.006	0.008	0.015	0.043	0.178	0.468	0.791
Wetland Basins	Nitrate Nitrogen, Total (mg/L as N)	91	4	4%	0.015	0.040	0.111	0.207	0.410	0.798	1.064
Wetland Basins	Nitrogen, Ammonia Total (mg/L as N)	188	1	1%	0.006	0.009	0.019	0.041	0.118	0.278	0.401
Wetland Basins	Nitrogen, Kjeldahl, Total (mg/L as N)	146	0	0%	0.640	0.717	0.888	1.146	1.376	1.691	2.073
Wetland Basins	Nitrogen, Total (mg/L as N)	201	0	0%	0.558	0.741	0.922	1.278	1.783	2.670	3.976
Wetland Basins	Phosphorous, Dissolved (mg/L as P)	114	0	0%	0.007	0.010	0.024	0.053	0.178	0.356	0.444
Wetland Basins	Phosphorous, Total (mg/L as P)	220	1	0%	0.014	0.024	0.040	0.070	0.183	0.405	0.522
Wetland Basins	Solids, Total Dissolved (mg/L)	25	0	0%	6.596	8.420	12.181	20.775	70.372	312.445	460.257
Wetland Basins	Solids, Total Suspended (mg/L)	211	0	0%	0.866	1.110	1.956	6.775	16.507	41.338	75.644
Wetland Basins	Zinc, Dissolved (ug/L as Zn)	7	0	0%	9.726	10.433	12.592	15.943	19.866	23.022	24.222
Wetland Basins	Zinc, Total (ug/L as Zn)	107	1	1%	8.342	9.903	12.884	19.005	40.343	124.055	227.030

Effluent Statistics					Effluent Percentiles						
BMPID	Parameter	Count	NDCount	%ND	5th	10th	25th	50th	75th	90th	95th
Wetland Channel	Lead, Dissolved (ug/L as Pb)	11	0	0%	1.425	1.674	2.751	5.129	15.298	41.726	61.601
Wetland Channel	Lead, Total (ug/L as Pb)	41	0	0%	1.008	1.079	2.308	5.387	13.481	41.883	112.900
Wetland Channel	Nitrate Nitrogen, Total (mg/L as N)	41	0	0%	0.056	0.081	0.122	0.235	0.458	0.841	1.544
Wetland Channel	Nitrogen, Ammonia Total (mg/L as N)	10	0	0%	0.030	0.036	0.062	0.132	0.338	0.810	1.087
Wetland Channel	Nitrogen, Kjeldahl, Total (mg/L as N)	33	0	0%	0.657	0.717	0.868	1.285	1.576	1.926	2.198
Wetland Channel	Nitrogen, Total (mg/L as N)	42	0	0%	0.729	0.851	1.033	1.491	1.949	3.650	9.669
Wetland Channel	Phosphorous, Dissolved (mg/L as P)	41	0	0%	0.039	0.045	0.059	0.080	0.136	0.188	0.226
Wetland Channel	Phosphorous, Total (mg/L as P)	43	0	0%	0.073	0.083	0.118	0.190	0.315	0.502	0.997
Wetland Channel	Solids, Total Dissolved (mg/L)	9	0	0%	80.579	89.337	116.846	250.169	890.815	1588.032	1806.235
Wetland Channel	Solids, Total Suspended (mg/L)	41	0	0%	3.126	4.359	8.931	19.119	75.927	322.275	992.616
Wetland Channel	Zinc, Dissolved (ug/L as Zn)	9	0	0%	6.392	7.679	10.642	22.766	105.009	236.595	291.699
Wetland Channel	Zinc, Total (ug/L as Zn)	9	0	0%	20.242	22.827	30.856	54.025	207.935	545.748	713.850